

REMARKS

In the Office Action, the Examiner indicated that claims 19-28 were pending in the Application. In accordance with the foregoing, claims 19, 20 and 27 have been amended in view of the Examiner's objection and claims 33-43 have been added, thus claims 19-28 and 33-43 are under consideration. The Examiner's rejections are traversed below. No new matter is included in this amendment.

Allowable Subject Matter:

At page 3 of the Office Action, claims 20-26 and 28 are objected to as being dependent on a rejected base claim but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claim. New claims 36-42 correspond to original claims 20-26, respectively, and new claim 43 corresponds to original claim 28. Claims 36 and 42, which correspond to original claims 20 and 26, respectively, have been drafted in view of the Examiner's objection to original claims 20 and 26. Thus, claims 36 through 43 are deemed to be in allowable form.

Claim Objections:

At page 2 of the Office Action, the Examiner objects to claims 20 and 26. The Examiner states that according to page 101 of the specification, "the light from the light compensating means does not reach the scanning means only when the film is free of scratches." Claims 19 and 20 have been amended to clarify the light produced by the light compensating means.

The Present Invention:

A film scanner of the present invention includes: a light source section for projecting light onto a film negative; and a scanning section which is for scanning light projected from the light source section transmitted through the film negative and is provided with an objective lens and a CCD (scanning means) which is an image pickup element. Further, in a light path between the light source section and the scanning section, a condensing lens is provided in the direction of emitting light.

More specifically, the light source section is composed of a first light source section (first light source) and a second light source section (light compensating means, second light source) formed on a substrate different from the first light source section.

The first light source section is movable in the direction parallel to a light axis, and chiefly projects light (condensed light) toward the scanning section through areas of the film negative other than a scratch area, and the second light source section, on the other hand, chiefly projects light (scattered light) toward the scanning section through the scratch area formed in the film negative.

The first and second light sources are each made up of a plurality of LEDs (light emitting means) having different respective spectral characteristics. The first light source section is provided around a light axis and in a domain where light directly reaches some point of a CCD, while the second light source section is provided within a domain from which light does not directly reach the CCD. With this arrangement, the second light source section can be used solely for eliminating scratch images, and will not influence light-source unevenness correction of the first light source section, when there is no surface unevenness such as the scratch in the film negative (See page 83, lines 4-15 of the specification).

According to the present invention, a light compensating means is provided so as to compensate insufficient light quantity due to the irregularity by taking advantage of the disturbance of the light path by the irregularity. In other words, by projecting light by intentionally using the refraction, etc. of the irregularity, the image at the position of the irregularity can be colored (See page 14, lines 11-23 of the specification.)

The 35 U.S.C. §102(b) Rejection:

At page 2 of the Office Action, claim 19 is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,754,278 to Kurtz.

Kurtz relates to a film scanning system including a light source 10, illumination optics 20, film gale 40, image lens 50, and CCD sensor 60. A light beam from the light source is direction through a first stage integrator assembly 25, a second stage assembly 30, and illuminating diffuser 38 which constitute the illumination optics 20, thereby being modified. The diffuser 38 further modifies the light by adjusting angular light diffusion, in order to illuminate a film with an optimal scratch suppression light distribution. The diffuser 38 also provides further improvement to the spatial uniformity.

The objective of the scanning system of Kurtz is to reproduce image information, which is typically recorded as amplitude information (dye densities) on the film, without recording a phase structure such as scratches and film matte. To accomplish this is to cause the system to have image light of a less numerical aperture (NA) than an illumination NA.

When the image lens 50 has an acceptance NA which is much smaller than the illumination NA, it is possible to record image information without recording the phase structure such as scratches and film matte. That is to say, only light within the narrow NA accepted by the imaging lens makes it through the lens to the sensor. The higher angle light is only imaged by the lens if it is deflected into the lens by a scratch or other phase artifact such as film matte. Thus, diffuse illumination compensates for the specular light which was deflected out of the imaging system by the scratches and other phase artifacts (See column 4, lines 34-41, column 4, line 56 to column 5, line 7, and column 7, lines 31-52 of Kurtz).

In comparison with the light compensating means of the present invention, Kurtz requires to further have complicated devices such as the illumination optics 20, and the imaging lens 50 has the acceptance NA appreciably smaller than the illumination NA (numerical aperture) so that the diffuse illumination compensates specular light deflected by a scratch or other phase artifact. Thus, on the contrary to the Examiner's assertion, the imaging lens 50 of Kurtz does not exactly correspond to the light compensating means of the present invention.

By adopting two devices, namely the imaging lens 50 and illuminating diffuser 38, Kurtz is structurally more complicated than the present invention. Moreover, since Kurtz achieves the compensation using the illumination NA and angular light diffusion, the disclosure of Kurtz differs from the light compensating means of the present invention which colors the image at the position of the irregularity by projecting light by intentionally using the refraction, etc., of the irregularity. Thus the present invention is not anticipated by Kurtz.

The 35 U.S.C. §102(e) Rejection:

At page 3 of the Office Action, claims 19 and 27 are rejected as being anticipated by U.S. Patent 6,239,425 to Hunt.

Hunt relates to a color scanning system including a scanning means, splitting means, direction means, and filtering means. In the color scanning system of Hunt, by using band pass filters, both scattered light and direct light are filtered and hence the intensities of the scattered light and direct light are balanced so as to reduce or eliminate the effects of imperfections in or on the image. More specifically, a first band pass filter 12r, 12g, and 12b filters the direct light, while a second band pass filter 13r, 13g, and 13b filters the scattered light.

In the meantime, the present invention does not require means and filters for splitting light transmitted from the image including the light scattered due to imperfections as in the case of Hunt, thereby simplifying the light source section.

Further, as to the Examiner's assertion that the band pass filters of Hunt correspond to the light compensating means of the present invention, as discussed above, the light compensating means of the present invention colors the image at the position of the irregularity by projecting light by intentionally using the refraction, etc. of the irregularity, and hence, in terms of the technical idea, the present invention is different from Hunt in which light intensities are caused to be balanced. Thus the present invention is not anticipated by Hunt.

New Claims 33-35

New dependent claims 33-35 have been added to recite additional combinations of features which are not disclosed in the prior art of record.

New Claims 36-43

New claims 36-43 are discussed above regarding Allowable Subject Matter.

Conclusion:

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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